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THE SUGAR SITUATION IN THE TROPICS.

THE present organization of the world's sugar trade and the enlarging scope of this industry exhibit one of the most remarkable developments known to modern economic geography. The geographical poles of the sugar trade are now Great Britain and the United States, and the two great areas of production are the beet-sugar countries of the continent of Europe and the cane-growing countries of the American and the Asiatic tropics. These two areas of production have been in active rivalry for the past thirty years, and out of this rivalry have come some striking results. The first is, that beet sugar controls the world's sugar market; for of the eight million tons that constitute the commercial supply of sugar, about five millions are produced from the beet, and the price of this portion of the supply practically determines the price of the three million tons of cane sugar also. Still more significant results are the removal of Great Britain from her once dominant position in tropical sugar production and the elimination of France and Spain from the struggle for leadership in the same line of enterprise, as economic conditions have centered the cane-sugar trade and industry in America. To-day the continental beet-sugar countries supply the United Kingdom with seventy-five per cent of its annual sugar imports (2,500,000 tons), leaving only one-quarter to come from the tropics. The United States, on the other hand, has become the chief market for tropical sugar. In both 1897 and 1899 the sugar imports to the United States (about 1,700,000 tons) ranked first in value among her imports, as well as first in the exports of the cane-sugar countries, amounting to slightly under a hundred million dollars. In 1898 the four principal ports of the United States took one-half of the world's production of cane sugar available for export.

This transfer of the main market for one of the most important tropical staples from Europe to America requires more than passing notice. The causes of the change are various. The policy of France is to develop her beet-sugar industry and to leave her tropical cane fields largely to care for themselves. Spain has now little share in the world's supply, outside of the Canary Islands, whose product is not important enough to be considered in trade estimates. The war with Spain, indeed, changed the title to some of the territory involved, but the tendency to a readjustment of the world's commercial relations in respect to sugar was already pronounced. The tropics as a whole are, in fact, passing under a new economic leadership; and in this change sugar has been the solvent of the old régime and the source of the new.

Another result of the rivalry between cane and beet sugar has been the general adoption, by both tropical and temperate nations, of the policy of supplying their demands for sugar by domestic production. The development of the beet industry has made this possible for countries that are without tropical colonies. Practically all European countries either produce, or intend to produce, substantially all the sugar they require for domestic consumption;[1] and the tropical countries which do not avowedly pursue the same policy are steadily becoming fewer in number. As a consequence, the competition becomes keener to dispose of the continental surplus and the tropical supply in the open markets. But it must be remembered that these two areas of production occupy radically different positions in the world market. As the continent is a liberal consumer, it throws upon the general market in normal times only the surplus of its crop; and upon the sale of this surplus depends the prosperity of only a limited class of the community. But in tropical sugar-growing this single crop is the mainstay of many communities to such a degree that the sudden suspension of the sugar industry is like a dissolution of social order. Under such circumstances, a surplus for a series of years is not easily to be faced. Yet it is such a surplus that has forced down prices in the past fifteen years and obliged the less progressive of the tropical producers to dispose of their annual supply at ruinous rates. From this level of lowered prices, moreover, must be considered the present condition and the future competitive capacity of the cane-sugar industry.

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[1] Fontana-Russo, Commercio dello zucchero, cap. iv. (Milano, 1899.)

If we rely on commercial statistics, without going beyond the facts of trade, the tropics have been losing ground, as compared with the beet-sugar countries. Taken alone, however, the production of cane sugar has been fairly constant, with a tendency toward an annual increase, for the past twenty years. When we go behind the trade figures, we see that beet-sugar statistics include both the quantities consumed at home and the amounts exported ; while tropical sugar statistics are based almost wholly on statements of the amounts that enter into international trade. The beet-sugar figures are, therefore, figures of production — that is, of exportation *plus* consumption ; while cane-sugar figures are figures of exportation — that is, of production *minus* consumption. The production of India, for example, is enormous : competent authorities estimate it at from two to three million tons of cane sugar.[1] Yet of this vast yield the relatively insignificant trifle of from twenty thousand to fifty thousand tons only is exported, and that alone appears in our statistics of the world's sugar crop. Furthermore, China's production is in all probability not below that of India. By combining these extra-statistical yields we should have a total of cane production in excess of the beet-sugar product by fully two million tons. Our commonly accepted ratios of the world's cane- and beet-sugar production probably involve gross underratings of the actual cane-sugar yield, because account is customarily taken only of that portion which the tropics contribute to commerce with the Western world. It is not a rash estimate, however, — though only an estimate, — to hold that the Oriental world actually consumes fully as much cane sugar as the Western world does of beet sugar. India and China probably consume as much as Great Britain and the United States.

A survey of the world's sugar-cane areas impresses one with the widespread distribution of cane culture. The sugar-cane zone of the globe is divided by the oceans into three geographical divisions: (1) *The Americas*, including the West Indies and the Sandwich Islands; (2) *Africa and Europe*, including adjacent islands in the Atlantic and Indian Oceans, respectively, and in the Mediterranean; and (3) *Asia and Oceanica*. In each of these grand divisions the limits of cane-growing for the manufacture of sugar extend considerably beyond the tropics of Cancer and Capricorn. On the American continent, for instance, sugar cane is raised up to the thirty-fourth degree of north latitude on the Gulf slope of the United States,[1] and as far as thirty degrees south latitude in Argentine Republic — somewhat less than one-sixth of the circuit of the globe. In Europe and Africa, and in the Orient, the limits are practically the same, cane culture reaching from southern Spain to Natal, and from northern Japan to New South Wales. The earth is thus girdled with a zone of cane-growing lands, within whose vast limits only comparatively insignificant portions have as yet been utilized for the production of the world's commercial supply of cane sugar.

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[1] Chisholm, Handbook of Commercial Geography, p. 131.

The annual production of cane sugar, at the present time, from all countries whose crops and exports are known to the trade, falls very little short of three million long tons. This total is distributed among nineteen island territories and seventeen mainland districts. Of these thirty-six sources of supply, as shown in the table below, twenty-four are included within the American geographical division. Nor are these all insular or coast lands. In both Peru and the Argentine Republic the successful production of cane sugar has been achieved upon lands far in the interior of the continent; and in British India cane-growing for sugar extends from Cape Cormorin northward to the very foot of the Himalayas. Africa and Europe, it may be seen, have only four main sources of supply. In Africa, Egypt is by far the most important present source; in Europe, Spain alone still maintains cane-growing, granting state aid in the valleys that lead down to the Mediterranean. Asia and Oceanica have eight principal commercial sources, including Java, Australia and the Philippines, but not considering Formosa, whose exports to Japan are larger than the average yield of Porto Rico, or the Straits Settlements in the vicinity of Georgetown. Apparently, among these geographical divisions, America shows the most extensive diffusion of areas devoted to the sugar industry. The relative importance of the world's cane-sugar districts to the Western markets is revealed by the following statistics:

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[1] Census of the U. S., 1890: Statistics of Agriculture, p. 68.

THE CANE-SUGAR CROPS OF THE WORLD.[1]

IN TONS OF 2240.6 POUNDS.

The Americas:	*1898–99*	*1897–98*	*1896–97*	*1895–96*
United States	235,000	310,447	282,009	237,720
Porto Rico	55,000	54,000	54,000	50,000
Cuba (crop)[2]	300,000	314,009	219,500	240,000
Hawaii	240,000	204,833	224,220	201,632
British West Indies:				
Trinidad (exports) .	50,000	53,000	53,000	58,000
Barbados (exports) .	45,000	47,835	52,178	47,800
Jamaica	27,000	30,000	30,000	30,000
Antigua and St. Kitts .	22,000	25,000	29,000	24,000
Other Lesser Antilles .	8,000	8,000	8,000	8,000
French West Indies:				
Martinique	32,000	35,000	35,000	35,000
Guadeloupe	40,000	45,000	45,000	45,000
Danish West Indies:				
St. Croix	12,000	13,000	13,058	8,000
St. Domingo and Hayti .	48,000	48,000	48,800	50,000
Mexico (exports) . . .	2,000	2,000	2,000	2,000

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[1] Willett and Gray's *Statistical Sugar Trade Journal* (New York) is the recognized authority on cane-sugar statistics. The figures used here are taken from this source. (See weekly editions of April 4, 1895, and April 13, 1899.) While conscientious effort is made to balance the figures of production by those of export and home consumption, it still remains true that cane-sugar statistics are largely estimates — sufficiently accurate, however, for all practical purposes of the trade.

[2] In 1894–5, two years earlier, Cuba, under normal conditions undisturbed by war, yielded 1,121,461 tons (Willett and Gray's *Sugar Trade Journal*, April 4, 1895, p. 6). In estimating the future influence of Cuba, this result must be kept in view, as likely to be repeated at no distant date.

Central America :				
Guatemala (crop) . .	11,000	9,000	8,000	7,000
San Salvador (crop) .	4,500	4,000	3,000	2,000
Nicaragua (crop) . .	3,750	1,500	500	500
Costa Rica (crop) . .	750	500	200	200
South America :				
British Guiana (exports)	105,000	106,070	99,789	105,000
Dutch Guiana (Surinam)	6,000	6,000	6,000	6,000
Peru (exports) . . .	110,000	105,000	71,735	68,000
Argentina (crop) . .	70,000	110,000	165,000	130,000
Brazil (crop) . . .	165,000	195,000	210,000	225,000
Total in Americas,	1,592,000	1,727,657	1,659,989	1,580,852
Africa and Europe :				
Spain	8,000	8,000	8,000	8,000
Egypt (crop)	100,000	80,000	100,000	92,000
Mauritius	160,000	120,000	150,000	140,000
Reunion	45,000	45,000	48,000	44,700
Total, Europe and Africa,	313,000	253,000	306,000	284,700
Asia and Oceanica :				
British India (exports) .	20,000	20,000	28,000	80,000
Siam (crop)	7,000	7,000	7,000	7,000
Java (exports) . . .	665,000	541,581	473,420	605,025
Philippines (exports) .	100,000	178,000	202,000	230,000
Cochin China	31,000	30,000	30,000	30,000
Fiji Islands (exports) .	35,000	30,000	30,000	30,000
Queensland	150,000	98,000	100,000	60,000
New South Wales . .	30,000	30,000	30,000	30,000
Total, Asia and Oceanica,	1,038,000	934,581	900,420	1,072,025
World's Crop,	2,943,000	2,915,238	2,866,409	2,937,577

A glance at these figures shows that the American tropics produce somewhat more than half of the cane-sugar crop of the entire world. During the period covered by these figures, the yield of this region, as well as that of the other geographical divisions, has been remarkably constant. It is evident that no division has made any extraordinary gains over the others, but that in the great majority of the older areas under cultivation the sugar industry is either in a stationary state, or is tending to a contraction of output. This is owing, no doubt, to unremunerative prices in many sections — *e.g.*, the British West Indies — under present agricultural and industrial conditions.

It is furthermore apparent that, geographically considered, cane-sugar production is still centralized within the two historical regions — the East and the West Indies — in which the natural advantages are substantially equal. Cuba, whose normal yield is one-third of the whole world's crop, is the centre of the Western region; Java, in the Malayan Archipelago, is the centre of the Eastern. These are typical regions and fairly represent the state of the industry in question. Together in 1894–95 they produced 55.7 per cent of the cane-sugar supply. Practically all the more important cane-growing areas are included in or are grouped about these two regions, under the politico-economic control of the leading Western states.[1]

Let us now consider the commercial production of cane sugar during the past seven years, from the standpoint of the political distribution of the present sources of supply. There are five European states which have sugar colonies in the tropics. What are the most evident tendencies as to the increase or decrease of production among them? This question seems to be answered by the following table:

THE POLITICAL DISTRIBUTION OF CANE-SUGAR PRODUCTION.

States and Colonies:	*1898–99*	*1895–96*	*1892–93*
French colonies	148,000	154,700	139,220
Dutch colonies	671,000	611,025	438,596
British possessions	752,000	704,800	550,540
Danish possessions	12,000	8,000	9,000
Spain and colonies	8,000	528,000	1,171,758
United States and possessions	930,000	237,720	230,000
Tropical American states	422,000	693,332	482,000
Total (in long tons)	2,943,000	2,937,577	3,021,114

From these figures it appears that the French sugar colonies are practically stationary as factors in the commercial supply.

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[1] Chisholm, Handbook of Commercial Geography, p. 332.

France imposes a duty, varying from thirty to sixty francs per hundred kilograms, on the refined sugar received from her own colonies,[1] largely for the sake of maintaining the domestic production of beet sugar; and this policy is too firmly established and too deeply rooted in the agricultural interests of the country to be suddenly changed. For the present France is, therefore, to be regarded as a constant factor in the tropical sugar situation. The Dutch colonies, on the contrary, have presented one of the surprising phases of the sugar movement in recent years, in the steady expansion of their production. The single colony of Java has shown within six years a gain of fifty-three per cent over the product of 1892–93. The explanation is to be sought in the partial collapse of the Cuban supply during the wars; in the temporary suspension of the Dutch export tax, in order partially to equalize the unequal competition of Javanese sugar with the bounty-fed sugar of Europe; and, finally, in the countervailing duty of the United States upon bounty-fed sugars, which gives the Dutch sugars an advantage in the markets of the United States. Under existing arrangements, the Dutch are more than likely to maintain their advantage among competitors; for Java is just now — and, until Cuba's recovery shall have been accomplished, will remain — the most prolific sugar island in the world. On the whole, too, the conditions of production in Java — the abundant supply of labor, the settled relations of labor to agriculture and the use of improved mechanical processes under expert supervision — give the colony a position in this industry from which it will be difficult to dislodge her.

The British colonies come next in importance to the United States as factors in the present and the future of tropical sugar. In spite of the depressed condition of the sugar industry in the British West Indies for some years, the output of British dependencies taken as a whole has made an advance of thirty-seven per cent since 1892–93. This gain, it is to be noted, has been made largely in Africa (Egypt) and the farther East — in Australia, Mauritius and the Fiji Islands. This total of trade statistics, however, takes no account of the progress of the sugar industry in the Straits Settlements and in Natal, from which a combined product of perhaps 45,000 tons is derived.

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[1] Brussels Conference on Sugar Bounties, p. 78.

It is possibly true that the British West Indies and British Guiana have, as a whole, been losing ground — slightly in quantity and more in the proportion contributed to the world's commercial supply. But there is no good reason to believe that this loss is to be permanent. The depression of the past fifteen years has resulted from the adherence to methods of production that are inadequate to cope with new conditions of competition. Already, however, reorganization has begun; and the British West Indian sugar industry is in a state of transition from the old semi-slave régime to one in which the leading features are the contraction of areas under cultivation, in favor of more fertile localities, the concentration of manufacturing in central factories and improved relations of labor to the land through "cane-farming." All the elements of a new development are present, with the possible exception of some kind of organizing leadership.[1] The necessary readjustment is likely to be slow, though recent events indicate that it is now being directed by most enlightened insight into the real difficulties and advantages of the situation. The recovery has already begun in the larger islands,[2] stimulated by the recently concluded treaties for reciprocity with the United States, by the subsidizing of steamship lines with the United Kingdom and Canada, and by the internal reforms in land policy.[3] Meanwhile, however, the total colonial yield of Great Britain's dependencies in the East and in Africa have more than offset the losses in the West. According to the late Baden-Powell's figures, the development of the twenty years from 1875 to 1895 was as follows[4]:

Exports (cwt.).	*1875*	*1885*	*1895*
British West Indies	5,603,000	5,823,000	4,740,000
Eastern Colonies and Africa . .	2,501,000	4,463,000	4,920,000

[1] H. Cox, The West Indian Agitation, p. 5; Cobden Club Leaflet, CXIII, 1898.

[2] "Jamaica's Development," N. Y. *Evening Post*, July 25, 1899.

[3] *Cf.* Report of the West Indian Royal Commission (London, 1897), C. 8655.

[4] "The Doom of Cane Sugar," *Fortnightly Review*, vol. lxi (1897).

The advance in the East, simultaneously with a period of depression in the West, must be explained by the enterprising methods followed in the former, both in cane cultivation and in sugar manufacture. Take, for example, Egypt and Queensland, as representative of the state of the British cane-sugar industry outside of the West Indies. Egyptian production has had but twenty-five years of experience. It is, therefore, a new industry, as compared with the two centuries of West Indian experience. Yet in this time the yield per feddan (1.03 acres) in marketable raw sugar has advanced from 1.44 to 1.94 tons — a gain of nearly thirty-five per cent, from superior methods of cultivation, carriage and manufacture.[1] The net profit to the grower is now variously estimated at from $7.50 to $22.50 per feddan. In 1893 there were in all Egypt 49,000 feddans in sugar cane, 36,000 of which belonged to the Khedive's Daria Senieh estates. The business is organized with a view to securing in manufacturing the economies of production on a large scale, while the system of cane culture involves considerable provision for a household tenantry. In no part of the tropical world has the sugar industry a sounder economic basis. Moreover, the feasibility of utilizing the irrigating resources of the Nile to extend the sugar-cane areas has already been demonstrated. The progress in cane culture on these estates from 1889 to 1893 is recorded in the following figures[1]:

Year.	*Feddans in Cane.*	*Cwt. of Sugar Obtained.*	*Average Tons per Feddan.*
1889	29,830	9,726,292	16.2
1890	25,527	9,136,923	17.7
1891	31,512	12,865,760	20.4
1892	34,698	14,517,587	20.9
1893	36,000	13,065,820	18.5

There has been a concurrent reduction in the cost of production in other than agricultural items. The distribution of the cost per ton of sugar among the three items — cultivation, manufacture and transportation — at the beginning and at the end of a four-year period shows which item bears the chief part in the reduction of cost.

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[1] U. S. Consular Report, 1894, XLVI, 38–44: "Sugar Production in Egypt."

MAIN ITEMS OF COST.	1888.		1892.		GAIN 1889–92.	
	TON OF CANE.	TON OF SUGAR.	TON OF CANE.	TON OF SUGAR.	TON OF CANE.	TON OF SUGAR.
Cane culture	$3.71	$39.35	$3.41	$31.93	$0.30	$7.42
Manufacture	.89	9.57	.90	8.43	–0.01	1.14
Transportation	.56	6.02	.59	5.62	–0.03	.40

The average cost of producing a ton of cane sugar on these estates has, it appears, fallen within this period about one-sixth.

Meanwhile, the price on the London market, for which the Egyptian sugar is made, has also declined, but a good deal less rapidly. The net gain thus insured is due in part, no doubt, to improvements in the quality of the output. In this respect, the progress since 1886 has been favorable to the position of the Egyptian product in the classification of the market. The lower grades of sugar produced by less progressive countries — such as a large part of the British West Indies — feel the present competition the most keenly. The following comparison shows what percentage of sugar and molasses of each grade was obtained from each hundredweight of canes in 1886 and in 1892, respectively, and indicates the tendency in Egypt to develop the highest grade of product.

Grades of Product.	*Pounds per cwt. of Canes.*		*Amount in Tons.*	
	1886	*1892*	*1886*	*1892*
First grade sugar	6.51	8.66	37,543	55,128
Second grade sugar . . .	1.77	1.59	10,167	10,160
Third grade sugar	0.55	0.44	3,143	2,776
Total sugar	8.83	10.69	50,852	68,064
Molasses	2.31	2.31		
Grand total . . .	11.14	13.00		

The position of second and third grade sugar and of molasses is, then, substantially that of by-products in the Egyptian sugar industry, while elsewhere these are the main output, overloading the market with a low-priced commodity. The conditions of labor in Egypt are also favorable for the production of high grade sugar at a relative low cost. Labor is low-priced, ample in quantity, well distributed and of excellent quality. The laborers are well domiciled, industrious and easily controlled. These are industrial elements not usually combined in the tropics. Further, to secure economy in organization and in technical management, well-trained European engineers are employed. On the Khedive's estates alone there are over 300 miles of tramways for conveying the cane from the fields to the central factories, with an enormous saving in cartage and in prevention of loss or deterioration by reducing the time between cutting and crushing. The cane fibre, after being crushed thrice, is dried, and furnishes three-fourths of the fuel for running the factories. In a country where fuel (coal) costs $9.75 per ton, this item alone might easily make up much of the difference between a profitable and an unprofitable industry.

If we take Egypt, Mauritius and Natal together, as African sources under English dominion, we see that British possessions still yield from eighty to eighty-five per cent of the commercial supply of cane sugar credited to Europe and Africa. Outside of these three districts, interest now centers in New South Wales and Queensland. Here, especially in Queensland, the fall of prices has not contracted the area of cultivation. On the contrary, the cane average has increased during the period of falling prices. The sugar industry has the backing of the government, through which farming interests and manufacturing companies have obtained advances of capital required to inaugurate this enterprise. Under the Sugar Works Guarantee Acts,[1] £201,680 were advanced between 1893 and 1895 to eight central sugar-mill companies. The amounts advanced are secured by mortgages to government, by shareholders' properties and by debentures held in trust as collateral by the public treasurer. Interest at five per cent is charged, and refunding begins about a year after borrowing. In 1896–97 eleven mills had unrefunded loans of £158,310, and twelve mills had received advances amounting to £359,989.[1] Refunding in forty half-yearly installments is generally the rule in these loans. The system of state-lending apparently works well. It brings capital to the industry at a low rate — much lower than that at which private corporations could get it; it relieves the government from encouraging the industry in any other form — such as by bounties, discriminating duties or tariffs; and it imposes a degree of publicity upon a new species of enterprise that is not by any means devoid of value in industrial policy. Queensland thus substantially guarantees interest and principal, to the limit of £500,000, of bonds for the construction of cane-sugar factories. The government has, however, the right to purchase debentures issued by these companies. Under this policy, so well planned and apparently as well executed, the commercial contribution of Australia to the world's supply has doubled since 1895–96.

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[1] Sixth Annual Report of the Auditor-General of Queensland (1895–96), p. xxi.

The Australian sugar industry is organized most advantageously, with respect to both the cane-grower and the mill-owner. The small mills of twenty years ago[2] have given place to a new system, in which the central factories are established on the largest scale; but the cultivation of canes is principally in the hands of the small farmer, be he proprietor or tenant.[3] By means of tramways the canes grown on 50,000 acres are delivered at the eighty or ninety central mills of the colony, and branches running in different directions connect the cane farms with the crushing mills so conveniently that the farmer markets his crop without having to leave the field. This economy of conveyance is also extended at Bundaberg to the piping of the cane juice from the crushing mills to the manufacturing and refining establishments, which are situated from two to seven miles away, near railways or wharves. The agricultural operations are equally effective. "The small farmer," says Consul G. W. Bell, "hires a few persons, black and white, and works with them, thus minimizing the labor cost." The large estates are being broken up and are going into the possession of the small proprietors; for the system of *petite culture* has won the victory over the great estates once wholly worked by the indentured labor of Polynesians. Hence, in point of economic efficiency, the system of cultivation in the cane-farming districts of Queensland is almost, if not quite, on a level with the beet culture of Germany, which it strongly resembles.

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[1] Public Acts of the Colony of Queensland (1896–97), p. 54.

[2] H. L. Roth, Report on Sugar Industry in Queensland (1879), p. 50.

[3] U. S. Consular Report, L, 344, 345, 1896.

In estimating the competitive capacity of the East, we may, accordingly, take Australia as representative of the newer developments in this industry. There the lands are gradually becoming the property of the cultivating class and are, therefore, in the best economic position to compete with European beet-root farmers. The labor of the Oriental farm is lower in price and is abundant in quantity, so long as the indentured system of supply exists; but the rise of small proprietorship will eventually substitute free migration. European engineering skill and superintendence have organized and are now developing the industry, on the basis of economies in manufacture, without that pauperizing of the farmer which results in some parts of the West Indies. The state lends capital to an extent and at a rate which counterbalances much of the advantage derived by European sugar enterprise from nearness to great centres of loan capital. With these facts before us, we may be sure that Australia will not be long in realizing her ambition to supply the whole consumption of these colonies. Then, with the aid of the other Eastern sugar districts, competition with Europe will begin, beet sugar will lose its prestige in the East, and the Oriental surplus product will figure more largely than ever in the Western markets.

The sugar situation in the Eastern tropics can afford little comfort to the beet-sugar industry of the European countries that are engaged in exporting their surplus. The fact is, that the tropical industry has been going through a transition, during which the beet industry has stolen a march on cane sugar. Meanwhile, out of the old system of small estate production, with wasteful machinery and methods of handling, the cane industry has developed the newer system of smaller sugar farms, coördinated with immense sugar factories in which all the improvements of European progress have been incorporated. Once the tropical sugar plantations are equally well equipped with machinery, and labor and land are both regarded from the standpoint of permanent productivity, the point of diminishing return will be far more remote than is the case with the beet-sugar enterprise.

A comparison, showing the relative productiveness per hektare of the Japanese and the German sugar fields, has been made by Dr. W. Krüger, of the Halle agricultural experiment station; and the facts thus brought out are a timely offset to the optimistic views of Paasche and others as to the future extent and security of the beet-sugar industry. The data given in the following comparison show that a hektare of sugar canes in Java yields more than twice the quantity of sugar obtained from a hektare of beets in Germany.

RELATIVE PRODUCTIVENESS OF CANES AND BEETS IN SUGAR.[1]

JAVA.				GERMANY.	
YEAR.	CANE PRODUCTION PER HEKTARE.	SUGAR PRODUCTION PER HEKTARE.	NO. OF FACTORIES PRODUCING AN AVERAGE OF OVER 100,000 KG. OF SUGAR PER HEKTARE.	BEET PRODUCTION PER HEKTARE.	SUGAR PRODUCTION PER HEKTARE.
	Kilos.	*Kilos.*		*Kilos.*	*Kilos.*
1893	82,902	8,711	7	27,500	3,394
1894	76,113	7,888	17	32,900	3,997
1895	86,335	8,451	22	31,000	4,064
1896	76,935	8,120	11	32,300	4,089
1897	85,464	8,602	30	31,300	4,003

A further survey of the Eastern situation reveals still more clearly that the tropics generally have entered upon a new era of development in the production of sugar. Their possibilities of expansion are shown by the fact that during the few years of the Cuban wars Java increased her product from 390,000 tons to 665,000 tons — a gain of over seventy-five per cent.

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[1] *Centralblatt für die Zuckerindustrie der Welt,* no. 25, VII, 470.

At the Straits Settlements of the Malay Peninsula (Penang) sugar is now being made on a large scale for $25 per ton,[1] a lower cost than Europe can afford now to consider. Formosa is just now one of the most backward of cane-sugar-producing countries in the matter of mechanical appliances, yet in 1897 Japan received from this island 66,068 tons,[2] a quantity equal to one-third or one-fourth the yield of the United States. With Japanese control, Formosa will undoubtedly become the means of ultimately excluding beet sugar from Japan, if not also from China. In this respect, Formosa seems destined to be the Cuba of the Eastern Pacific. Moreover, Japanese sugar policy during the past fifteen years strongly emphasizes the probability of this outcome.

We now turn to the Western tropics. The one policy ruling in the six tropical American states — Mexico, San Salvador, Nicaragua, Peru, Argentine Republic, Brazil — is to supply their own slight needs and then to throw the main portion of their product upon the European and American markets. Though these states, including Hayti and San Domingo, now yield, on an average, about eighteen per cent of the commercially available product, it must not be forgotten that in 1895–96 they came within a few thousand tons of ranking first among the cane-sugar districts of the world. In Brazil, Argentine Republic and Peru — the three leading sugar countries in South America — the sugar industry is well established on a modern basis, capable of almost indefinite development. The systems of cultivation and the methods of manufacture have been encouraged by governmental aid. Under this policy Brazil has made wonderful strides since 1890. In 1889 Brazil produced only enough to meet her domestic demands, about 100,000 tons; but in 1893–94 the state of Pernambuco[3] alone, which is now but one of five leading sugar states, yielded a crop estimated at 220,000 to 250,000 tons. By a system of premiums, rising with the percentage of sugar extracted from a given weight of canes by the diffusion process, capital has been attracted to this industry. Besides improving the methods of manufacture, the policy of premiums has reacted with excellent effect upon cane cultivation, by encouraging the development of those varieties whose saccharine yield is the most satisfactory in quantity and quality. Besides this, the general government has been guaranteeing a six per cent dividend upon capital invested in sugar factories of a given capacity per year. In 1890 as many as eighty factories, with a guaranteed investment in capital stock of some 58,650,000 milreis, were in operation.[1] The very low price of raw brown sugar and the comparatively high price of white crystallized sugar proved very advantageous for the refining industry also. In the state of Bahia one refinery, whose sales amounted to $150,000, realized a profit of $32,000 on its investment. There is, thus, no important branch of the sugar industry that is not being developed in opposition to a supply from outside.

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[1] U. S. Consular Report, XLIX, 139, 140. This is at the rate of one and one-half cents per pound or less (by long ton). Not even in Cuba has this minimum been reached. — See Porter, Industrial Cuba, pp. 285–289.

[2] Mr. S. Uchida, Japanese Consul at New York in private correspondence.

[3] U. S. Consular Report, XLI, 80, 1893.

The same is true of the Argentine Republic. Since 1886 the policy of the government has been to foster the cultivation of cane and the erection of sugar presses. The present product not only satisfies apparently all home demands, but leaves fully 30,000 tons for exportation. The tariff on imported sugar is so arranged as to discourage imports and to encourage domestic refining.[2] The single province of Tucuman — the home of Argentina's sugar industry — is credited with a crop of 150,000 tons for the year 1897–98.[3]

Peru is, next to Brazil, the largest exporting country in the American group of sugar states, having furnished 110,000 tons in 1898–99. Sugar has there acquired the rank of a leading national industry, thoroughly reorganized financially, and now operated on a more extensive scale than ever before. The capital invested in 1894 amounted to $16,700,000, and the annual product is valued at $4,000,000.[4]

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[1] U. S. Consular Report, XXXIV, 657, 1890.

[2] Bulletin of American Republics, April, 1896, p. 566.

[3] *Ibid.*, April, 1898, p. 1661.

[4] *Ibid.*, December, 1895, pp. 352–362.

All the tropical American states are, actually or potentially, in a position to put a surplus upon the sugar market, rather than to afford to other countries a market for a surplus. This situation tends gradually to reduce prices still further, or to force European beet-sugar countries back upon production for domestic supply, with only incidental or at least secondary regard for foreign markets. With English colonies contributing an increasing share of the United Kingdom's consumption, and with the United States supplying their demands from Cuba, from Porto Rico, from Hawaii and from production at home, the two best markets of the world are not at all secure to the beet-sugar producers of Europe. That continental interests have already begun to reckon with this prospect, is evident from efforts to restrict beet-sugar production.

> As far as America ceases to be a customer [says a Hamburg trade circular] the whole English sugar demand can be supplied with cane sugar. . . . In well-informed American sugar circles they are convinced that Cuba will cover the entire sugar demand for America in the course of two or three years.[1]

Meanwhile, Great Britain has entered into a ten-year contract to subsidize closer steamship communications with her West Indian sugar colonies.[2] This has had a stimulating effect upon investments and has gone far toward neutralizing the depressing effects of beet-sugar bounties upon cane-sugar prospects.[3] Indeed, the tropical sugar world is rapidly coming to the conclusion that these once dreaded bounties have about spent their force, and that the capacity of the cane-sugar communities to survive depends upon conditions largely independent of the bounty regulations of their European rivals. Under this impulse, the tropics have already entered upon a far-reaching economic transformation.

The influences which have brought about this noteworthy, if not fundamental, change in the tropical sugar situation are manifold and complex. They may, nevertheless, be classified as follows:

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[1] Trade Circular of A. Jahn & Co., Hamburg. — Quoted in the Philadelphia *Press*, October 1, 1898.

[2] "England's Plans for Trade," N. Y. *Times*, July 19, 1899.

[3] "Trinidad's Sugar Yield," Philadelphia *Press*, August 1, 1899.

1. The passage of large portions of tropical territory under the political, and hence economic, control of countries that have hitherto relied largely on the tropics for their sugar supply. The flag follows trade, not *vice versa*, especially in the relations of the Western nations with the tropics. The most signal examples of this transfer of tropical territory to industrial states are the passage of Formosa under Japanese sovereignty; of Cuba, Porto Rico, Hawaii and the Philippines under the control of the United States; and of Egypt under the rule and regenerating leadership of Great Britain. The appearance of the United States in the West Indies has aroused Great Britain to a more positive policy toward her own dependencies there. The "policy of drift" is of necessity being abandoned, in favor of systematic development. Nothing less vigorous is to be expected of either Japan or the United States.

2. The transition from the more extensive to the more intensive methods of cultivating cane lands, and the adoption of systems of land tenure which involve an increased efficiency of labor upon land, as compared with the older systems. This latter influence appears in Egypt, Trinidad and Queensland, where cane-farming by household occupants of the land has resulted in a great reduction in the cost of canes to the sugar factory. In some cases, this system of tenure has restored abandoned estates to cane culture.

3. The more general adoption of European methods of handling canes between the field and the factory; the utilization of by-products, as in the use of fibre for fuel to run factory engines; and the employment of American and European machinery, by which a larger percentage of yield is obtained and the wastefulness of the older methods is exposed and abandoned. With these changes has also come technical skill in making the tests which decide the relative value of varieties of canes and the methods of treating them economically.

4. The gradual improvement of trade relations between sugar-producing and sugar-consuming countries, aided consid-

erably, no doubt, by the rivalry of Western nations for tropical trade. Examples of this influence are seen in the reciprocity treaties with the United States and the subsidizing of cable and steamship communications between European countries and their tropical colonies. Thus the tropics have been brought, as producers and consumers, into closer commercial relations with the producing and consuming elements in the Western nations. The effect has been to give a newer and vaster scope to the surplus capital of the latter and the surplus products of the former. On the other hand, the negative restraints upon trade among the Western nations — such as tariffs, bounties, countervailing duties and the like — have tended to check investment in certain industries that are rivals of tropical industries. For example, India[1] and the United States exclude bounty-fed beet sugar; and the reciprocity treaties with the United States, by favoring tropical sugar with a minimum duty, put a narrower limit to beet-sugar development, now prospering under a protective tariff and state bounties. The general effect of these positive aids to trade, as well as of the negative restraints, has been to encourage tropical enterprise in which sugar plays a leading rôle.

The part which the United States and her tropical dependencies are playing in the present sugar situation is somewhat problematical. The remoter possibilities are enormous, but the more immediate outcome is probably overestimated. Independence of foreign supply, in meeting domestic consumption, is not so near at hand as many anticipate. This year's product of sugar from all the sources under the control of the United States, and including cane, beet, maple and sorghum, is barely a million tons, though the country consumes two million tons annually. Hawaii has in all probability reached her limit of production, after twenty years of stimulation under reciprocity arrangements. All her natural cane lands are under cultivation, and Hawaii, like Egypt, will have to depend on irrigation to extend sugar cultivation.[2] The Philippines rank with

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[1] Regulation in effect March 20, 1899, avowedly as a protective measure.

[2] Young, The Real Hawaii, App. C, "Sugar," p. 322.

Hawaii, each producing about a quarter of a million tons. Except in the island of Negros, where European mills exist, the methods of cultivation and of manufacture are antiquated and therefore expensive ; and estates are small, not more than a dozen producing 1000 tons of sugar per year, though this is the daily product of many Cuban factories. "The labor problem," says Professor Worcester, "is a most serious one," because of the ease with which the natives of the tropics can get a livelihood and the consequent difficulty of holding native labor to its contract.[1] Importation of Chinese labor into the Philippines is fraught with social dangers. In Porto Rico the sugar industry is nearer dead than alive ; for, though it still yields annually about 50,000 tons, its methods are as backward as those of most of the older cane-sugar islands in the West Indies. The land system, the labor system and the transport facilities, as well as the methods of manufacture, are such as, under modern conditions of competition, must bankrupt any industry.[2] The redeeming feature is the presence of the thousands of small peasant holdings, occupied by households accustomed to cultivate canes.[3]

In Porto Rico, as in Cuba, the sugar industry must be reorganized on a sounder economic basis, if it ever regains its former prestige. And no basis of development will be solid which does not encourage native proprietorship in land as a corner stone. The wage system cannot develop the normal degree of economic resources in tropical labor. It may extinguish native labor, as has been done largely in Hawaii in the interest of the sugar industry, by importing migratory hordes from whatever country is willing to lend its subjects to such exploitation. But we are pledged to administer these islands in the interest of their native peoples. Of all the difficulties in the way of Cuban restoration the land problem and the labor problem are the most formidable. We must never forget that the collapse of Spanish dominion was equally the collapse of an old economic régime, tottering on the verge of dissolution from exhaustion of capital and of labor, even at the time of its output of over a million tons of sugar a year (1894–95). There is as yet no adequate economic analysis of Cuban conditions, furnishing facts from which one could deduce the outlines of a rational sugar policy for the United States to follow. Yet the writers of books on Cuba give glimpses of conditions that clip the wings of prophecy,[1] and force upon us the conclusion that nothing short of a thoroughgoing transformation of the relations of the people to the land will suffice to develop the sugar resources of Cuba, under the quickening impulse of capital. If, therefore, the United States proposes to administer her new territory in the interest of the native population, it will be necessary to place the permanent welfare of all economic interests above the speedy exploitation of land and labor in the interest of immediate returns upon capital. This policy will take time, patience and faith, as the elements required to re-lay aright the economic foundations of agricultural Cuba. For Cuba is far above all else agricultural, not commercial or industrial; and to agriculture must we look for the key to the tropical sugar situation, here as elsewhere. As things stand now, Germany continues to control the world's sugar situation — not because of any superiority over the tropics in machinery, nor because of the advantage of fiscal bounties over tropical resources of the soil, but because all the natural advantages under the prevailing slipshod methods of tropical cane cultivation are more than counterbalanced by the scientific methods of European agriculture applied to beet-farming. When the tropics apply to the cultivation of canes (which covers half of the cost of producing sugar) the same degree of scientific attention that has been given to the methods of manufacturing the canes into sugar, then — and not until then — need the beet-sugar interests of Europe look to their laurels, under the present conditions of the trade.

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[1] The Philippine Islands, pp. 260, 508, 509.

[2] Robinson, The Porto Rico of To-Day, c. xi ; Ober, Puerto Rico, pp. 56-58.

[3] Hill, Cuba and Porto Rico, p. 159.

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[1] Porter, Industrial Cuba, p. 290.